

1014

'E R T' SERVICE CHART

BAIRD 301 AM/FM

SEVEN valve table model receiver covering long, medium and VHF bands. Suitable for 195-250V. AC only. Manufactured by Baird Television, Brighouse, Yorks, the set was released August, 1955, and is priced at £30 10s. 0d., inclusive of £8 8s. 0d. purchase tax.

AM circuit is normal superhet type employing ECH81 frequency-changer V1, EF89 IF amplifier V2, EABC80 detector and AF amplifier V3, EL84 output pentode V5 and EM34 magic-eye indicator V7.

FM circuit uses ECC85 RF amplifier and self-oscillating mixer V1, ECH81 first IF amplifier V2, EF89 second IF amplifier V3, and EABC80 ratio detector and AF amplifier V4. Remainder of circuit is as for AM.

IF for FM is 10.7mc/s. for AM 470kc/s. Wavebands: LW 1,030-2,000m.; MW 200-550m.; and FM 87.7-95.6mc/s.

Speaker is 6½in. circular type, and mains consumption is approximately 60W.

FM OPERATION

Aerial. Receiver incorporates a built-in aerial which operates as a dipole on FM and as a plate on LW and MW, if required. To use the internal aerial the twin leads from it should be plugged into the 300 ohm aerial sockets. If it is required for LW and MW the small wander plug on aerial panel should be plugged into the LW, MW aerial socket.

For use with an external FM aerial an 80 ohm coaxial input socket is provided, the internal aerial being unplugged. The external FM aerial can be used for MW, LW, reception in the same manner as before.

Signal is aperiodically coupled across grid and cathode of V1A by L5 L6, C1 being shunted across L5 to provide correct matching for different aerials. L1, C4, in series with V1A cathode, form IF rejector circuit.

Feed from V1A anode to V1B grid is conventional, signal being fed to a point of zero oscillator potential to prevent oscillator radiation, C11 providing adjustment for minimum radiation.

Oscillator is tuned grid type. IF output appears across L10, tuned by C15 to 10.7mc/s.

IF Stages. For FM operation triode section of V2 is rendered inoperative by S1B, which removes the anode HT supply. A small voltage appears on the anode, due to R13, to prevent cathode poisoning. R13 performs a similar function on AM for V1.

V2 operates as first IF amplifier on FM, V3 is second IF amplifier and partial limiter. The limiting is effected by C37, R14, which cause grid limiting on large signals.

Ratio detector. Centre-tapped secondary L25 of IFT2 feeds the ratio detector circuit. Signal is fed to centre tap by L24 which is close-coupled to primary L23. Voltage in L23 leads or lags current as input frequency swings above or below 10.7mc/s.

Voltag es are induced in two halves of L25 with phase variation in step with variation of phase in L23, i.e., in accordance with modulation.

Voltages at top and bottom of L25 are equal and opposite at any time and to these two voltages a reference IF is added from L24.

The resultant voltages obtained are applied to the two ratio detector diodes, and are such that their ratio is proportional to the modulation.

Two diodes each have two conducting paths. The path via L24 R18 R19 is common, but the respective currents flow in opposite directions, hence, with no modulation they balance out and no voltage appears across R19. When modulation is applied an AF voltage appears at junction of R18 R19.

C52 functions as an automatically variable diode load and serves to smooth out any amplitude variations.

R20, C50 form de-emphasis network compensating for treble boost applied at transmitter.

AM OPERATION

Aerial input is transformer coupled to signal grid of V2 and mixer and IF stages are conventional.

Volume control is VR2. Signal is fed from S1B, via C59 to top of control, AF signal being taken from slider of VR2 through C61 to grid of V4 triode which functions as AF amplifier.

Tone control VR1 in conjunction with C60 forms top-cut control across volume control and C59.

AVC is derived from signal diode circuit and is applied to V2, V3. AVC is not used on FM, the AVC line being earthed by S1D.

Output stage. Output valve V5 is fed from anode V4 by C58 and grid stopper R30. Feedback network R32 C56 R28 R29 is connected between anode and grid with switches S1A, S1B.

On FM operation R29 is cut out by S1A giving increased bass lift to compensate for increased high frequency response available.

HT is derived from indirectly heated full wave rectifier V6, smoothed by R34 C32B and C. Reservoir capacitor C32C is rated for 200mA ripple current.

Magic-eye indicator is conventional type, indicator grid voltage being taken from point on AVC line between R8 and R24. The remote end of R8 is earthed on FM to render AVC inoperative, so tuning indicator operation is unaffected.

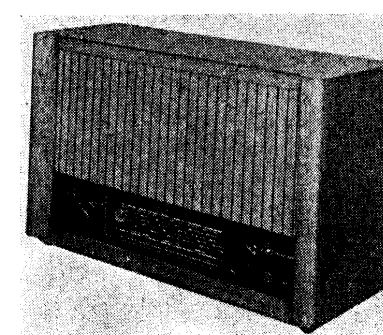
Modification. Sets with serial number 1,000-1,999 inclusive are fitted with EF85 as V3; R16 is 56K ½W; C41 is between R17 and pin 8 V3. Note: Ratio detector transformer used with EF85 is not suitable with EF89.

Removal of chassis. Remove four control knobs (pull

VALVE VOLTAGES

		Anode	Screen	Cathode
V1	ECC85 (a) ...	148	—	1.9
...	(b) ...	154	—	0
V2	ECH81 (p)-AM ...	225	81	0
...	" -FM ...	212	72	0
...	(r)-AM ...	96	—	0
V3	EF89-AM ...	216	77	0
...	" -FM ...	200	67	0
V4	EABC-AM ...	67	—	0
...	" -FM ...	62	—	0

For EM34, EL84, EZ80, see overleaf.



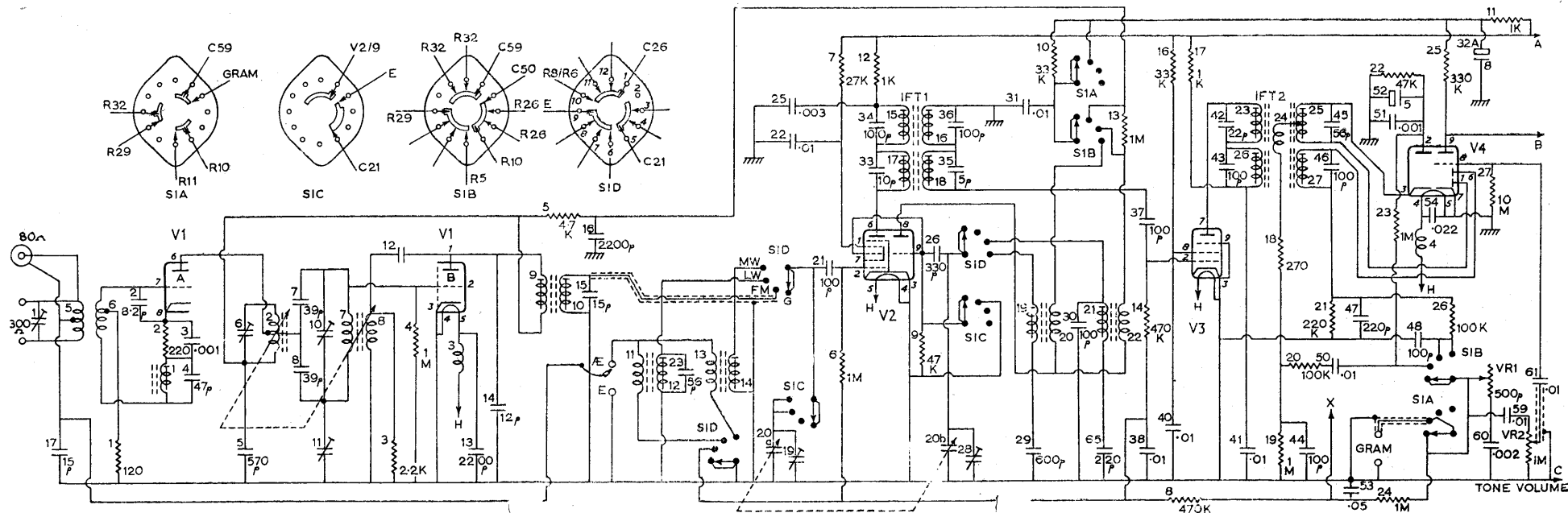
off), remove four chassis fixing screws from underside of cabinet and unsolder speaker leads from speaker. Slide chassis out gently.

FM ALIGNMENT

IF. Inject 10.7mc/s, AM modulated, from signal generator across 100 ohms to grid of V3 via C37. Adjust IFT2(FM) bottom core, for maximum output on tuning indicator, and top core for minimum sound from speaker. The latter should have a sharp null point. It is essential that cores in ratio detector coil should always be in outer tuning positions, otherwise coupling coefficient will be made too large.

Now inject 10.7mc/s across 100 ohms into V2 mixer grid via 47K resistor. Adjust L18 L17 10 9 for maximum output.

If frequency modulated signal generator is available connect as above with sine wave deviation of 85k/cs and

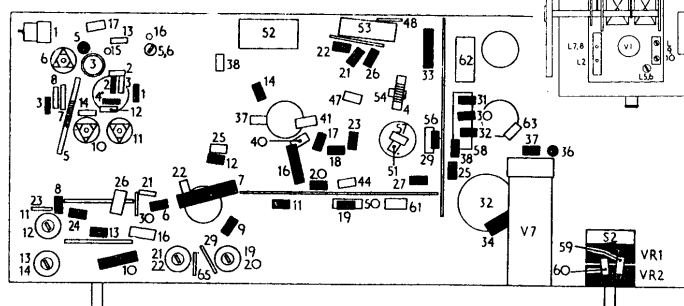


Resistors

Wirewound 6W: R34
Carbon 1W: R7
Carbon ½W: R10 16 33
Remainder all carbon ½W

Potentiometers

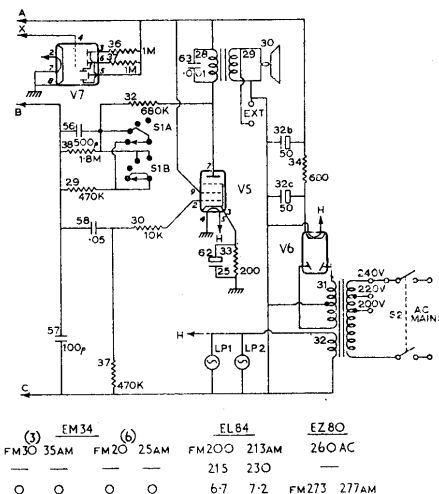
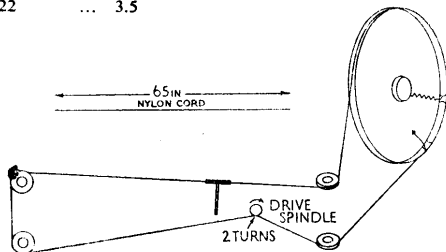
Coaxial carbon: VR1 VR2

**Capacitors**

Paper tubular 350V: C25 31
40 41 51 53 54 58 60 63
Paper tubular 150V: C22 38
50 52 59 61
Silver Mica: C17 21 23 26 29
30 33-37 42-48 56 57 65
Electrolytic 350V: C32 A B C
Electrolytic 150V: C52
Electrolytic 25V: C62

INDUCTORS

L	Ohms	L	Ohms
1-10	... Very low	23	...
11	... 7.5	24	... Very low
12	... 11	25	...
13	... 26.5	26	... 18
14	... 27	27	... 18
15	... 1½	28	... 450
16	... 18	29	... Very low
17	... Very low	30	... Very low
18	...	31	... 250
19	... 3.5	32	... Very low
20	... 1	33	... 30
21	... 10.5		
22	... 3.5		



re-check L18 17 10 9 so that the maximum undistorted audio output is obtained. The latter operation is simplified if output wave form is viewed on an oscilloscope connected from junction of R20 and C50 to chassis; slugs may then be adjusted for maximum undistorted sine wave.

If no frequency modulated signal generator is available this operation may be carried out after RF circuits have been aligned using tuning note from a transmission, although this is less satisfactory as the modulation depth will not be so large.

Oscillator radiation. With scale set at centre and with a VTVM connected across C6 adjust C11 for a minimum reading which should be less than 1 volt. It is essential that probe connection to the VTVM be used with short leads.

RF and oscillator adjustment. Set signal generator and scale to 88mc/s and adjust C10 for maximum output. Check with signal generator and scale at 95mc/s. If scale tracking is out, small movement of ceramic capacitors C8, and C7 together or apart from each other will correct for this. If spread is too large move the condensers together and vice versa.

With signal generator at about 90mc/s and receiver tuned to this frequency adjust C6 for maximum output.

IF rejection. Inject 10.7mc/s from the signal generator at a level of about 100mv across the 300 ohm aerial sockets and adjust L1 for minimum output.

Aerial trimming. With receiver connected to its normal aerial, either internal or external, finally adjust aerial trimmer C1 for maximum output on a transmission.

AM ALIGNMENT

A calibrated signal generator and standard output meter are required. A dummy scale is printed on back of scale pan and gives alignment points required. Check that the gang is fully closed when the pointer is on the 550m mark.

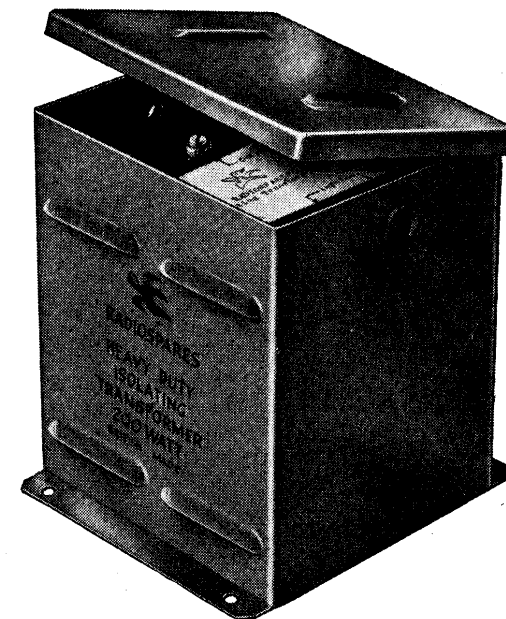
Apply signal as stated below	Tune Receiver to	Trim in order stated for Maximum Output
470kc/s to V2 g1 via C21	Mid scale MW 500m	L27, 26, 16, 15
600kc/s to AE via 200pF	200m	L19, 14
1,500kc/s as above	1,500m	C19 C28
200kc/s as above	Repeat as necessary for correct alignment	L21, 12

★ Are YOUR Engineers BENCH-SAFE?

We hope that no one has "caught a packet" in your Service Department as yet, but remember—it may happen any day! You can take one of two precautions. Either you look into Employer's Liability Insurance (if you are self-employed, a good "Life" Office is recommended) or provided you are on A.C. Mains, install immediately to every "Bench point" one of our

"HEAVY DUTY" ISOLATING TRANSFORMERS

200 WATT at 88/6 EACH



Today's orders dispatched today

Keenest prices

Every component guaranteed

Supplies to the bona fide trade only

Of course, you know that our Catalogue, which, if you are a recognised member of our Trade, is readily at your disposal, will give you fullest details, not only of our Isolating Transformers, but also of the multitude of our other quality components. (All prices quoted are "Net Trade" prices.)



Radiospares Ltd.

4-8 MAPLE STREET • LONDON W1 • ENGLAND

Telephone: EUSton 7232-7

TELEGRAMS: RADOSPERS, WESDO, LONDON • CABLES: RADOSPERS, LONDON